MT3060X-UG001

MT 3060

User Guide

Version 1.2

NOVATEL WIRELESS

May 31, 2015

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1

Introduction

Description
Technical Specifications
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Description

Novatel Wireless designed the MT 3060 for the Usage-Based Insurance (UBI), telematics, and fleet management markets. The MT 3060 has a rugged plastic housing and includes a disconnect alert feature that uses an in-device backup battery. The MT 3060 is available in GSM/GPRS, 1xRTT, and HSDPA versions. It contains an internal GPS, a cellular antenna, a J1962 compliant OBDII connector, and 4 LED indicators. It also contains an internal SIM card holder.

Figure 1-1: Top View

Technical Specifications

General

Name:	MT 3060
Model:	GSM2398, RTT2221, UMT2212, UMT2213-60, UMT2214
Approvals:	FCC, CE, RoHS2, Industry Canada
Housing:	Rugged textured plastic enclosure UL94-Vo fire
Dimensions:	55 x 49 x 29 mm
Battery:	Rechargeable lithium-ion battery (230mAh)
Recharge Temperature Range:	0 to +45° C
Operating Voltage:	9 to 16 V DC operational for 12 V vehicle

Radio Technology

Quad-band EDGE/GSM/GPRS:	850/900/1800/1900 MHz
Tri-band DC HSPA+/HSPA+/ HSPA/UMTS:	850/1900 MHz or 900/1900/2100 MHz

Packet Data

Packet Data:	Class B, Multislot 8 GSM/GPRS Rel 97
SMS Functionality	
- GSM/HSDPA SMS:	Text, PDU, MO/MT, Cell Broadcast
- CDMA SMS:	Text, MO/MT

Environmental

Operating Temperature:	-20° C to +60° C
Storage Temperature:	-20° C to +60° C
Humidity:	Up to 85% non-condensing
Vibration Stability:	In accordance with SAE J1455

Components

GPS Protocols:	NMEA, Binary
Buffered GPS Message Feature:	Yes
Accelerometer:	3-axis digital (for driver behavior) 3-axis analog (impact detection)
On-Board Diagnostics (OBDII):	J1850 PWM, J1850 VPW, ISO-9141-2, ISO-14230 KWP2000, and ISO-15765 CAN protocols supported, VIN, excessive engine speed (RPM), vehicle speed,vehicle battery voltage (low battery warning), check engine light (MIL alert), odometer (trip distance), idle time reporting, low fuel alert.
SIM Access:	Internal
Cellular Antenna:	Internal
GPS Antenna:	Internal
LEDs:	GPS (yellow), Cellular (green), OBD (red), Bluetooth (blue) [Bluetooth currently unavailable.]
OBDII Connector:	J1962 compliant

Protocols

OBD Protocols:	ISO 9141-2 ISO-15765 ISO 14230 KWP 2000 J1850 PWM J1850 VPW Some vehicles only support a subset of these protocols, which may limit the functionality of the MT 3060.
Host Protocols:	AT commands, UDP API, FOTA
Internal Protocols:	UDP API, TCP API
API Control/Status:	AT commands, UDP API, TCP API, AT commands over SMS

Part Numbers

GSM2398-00	(GSM/GPRS)
RTT2221-00	(CDMA 1xRTT)
UMT2213-00	(HSDPA + GPRS/Edge)
CAB2374-01	(J1962 extension cable)

Document References

MT3060G-AT144	MT 3060 G AT Command Reference
MT3060R-AT144	MT 3060 R AT Command Reference
MT3060U-AT144	MT 3060 U AT Command Reference
GSM0000AN019	GSM Network Configuration Worksheet
ENF0000AN012	AT Commands Over SMS

Additional Features

GSM Registration	GPS Status	Input Event Counter
GPRS Registration	Timer	GPS Overspeed
Velocity	MT Power Save	Message Log Count
Geo-Fence	RTC Alarm	SMS Indication
IP Status	Memory Full Percentage	GPS Distance

On-Board Diagnostics Overview

The Novatel Wireless MT 3060 connects to a vehicle's On-Board Diagnostics (OBDII) port and monitors the OBDII system using communication protocols. An On-Board Diagnostics (OBD) system controls engine functions and serves as the diagnostic control network of the vehicle. All cars built and sold in the United States since 1996 require the newer OBDII system.

You can configure the MT 3060 to provide notification messages based on events triggered by:

- Accelerometer change
- Check engine light (MIL alert)
- Engine RPM
- GPS information
- Idle time
- Low fuel
- Trip Odometer (trip distance)
- Vehicle battery voltage (low battery warning)
- Vehicle Identification Number (VIN)
- Vehicle speed

WARNING! Some vehicles are not compatible with the MT 3060. If a vehicle is not compatible with the required MT 3060 parameters, then functionality may be limited, problematic, or unavailable.

The 1979 Society of Automobile Engineers (SAE) standard defines the method for requesting diagnostics data and provides a list of standard parameters from the engine control unit.

Since the vehicle manufacturer is responsible for complying with the SAE standard, Novatel Wireless cannot guarantee that the MT 3060 will perform with every vehicle.

2

Features and Functions

GPS
LEDs
Power
Backup Battery
Accelerometer
GSM Radio
New Event Reporting
AT Commands Over SMS

GPS

GPS functions include:

- NMEA update with all data points
- Novatel Wireless Binary Packets
- Buffered GPS message feature
- Geo-fencing
- Virtual odometer

LEDs

The MT 3060 includes LEDs to indicate OBDII, Network, and GPS status.

The following figures show the MT 3060 OBD II connector and LEDs.

Figure 2-1: MT 3060 Connectors

Figure 2-2: MT 3060 LEDs

The following table describes the LED operation.

LED	Description
OBD (Red)	• The OBD LED flashes at a fast rate when the unit is first connected to the OBD port for power. • Once a protocol is discovered through the OBD port, the LED flashes at a slow rate.
GPS (Yellow/Amber)	• The GPS LED flashes at a fast rate when the unit is acquiring a satellite fix. • Once a fix is acquired, the LED flashes at a slow rate.
NETWORK (Green)	• The NETWORK LED flashes at a fast rate when the unit is finding cellular coverage. • Once cellular coverage is found, the LED flashes at a slow rate.
BLUETOOTH (Blue)	The BLUETOOTH LED indicates bluetooth connectivity. (Not currently supported)

Power

The MT 3060 requires 9 to 16 VDC with a minimum 2 amps of input power. Pin 16 on the 16-Pin I/O connector is the positive power input, and pins 4 and 5 are ground. This device contains a battery.

NOTE: This battery is not to be removed or replaced by the user.

NOTE: Because this device may contain a Lithium Ion Battery, when disposing of this device please do so according to local recycling laws.

Backup Battery

The MT 3060 comes with a backup battery installed. The battery is a 230 mAh rechargeable Lithium-ion.

The primary function of the backup battery in the MT 3060 is to provide enough power to allow notification to a user when there is a loss of power to the device. Power loss can indicate device tampering or battery disconnection or removal.

You can use Input Event 63 to trigger an output event that can be configured in the same manner as the other output events. If the modem is off (to save power), this event is turned on. If GPS data is configured in the output event and the data is not available, the last known position can be configured to be used in the output message.

You can use AT$OBDBBT to configure the time (in seconds) that the device stays powered after removal from the vehicle. The range is 30 to 6000 seconds with the default being 600. In addition, to prevent damage to the battery, the device turns itself off when the battery reaches the level determined to be the lowest "safe" value.

If the configured output message has not been sent when the timer or battery level dictates that the device should shut down (and is configured to do so), the message is saved and sent the next time the device registers on the network.

Accelerometer

The three-axis digital accelerometer provides the following features:

- Motion alert (towing alert)
- Driver behavior reporting
    - Rapid acceleration
    - Harsh braking
- Configurable thresholds
    - Range settings
    - Mode (Normal, Sleep, Wakeup)
    - Device Orientation Setup

The three-axis analog accelerometer provides the following feature:

- Impact detection

GSM Radio

The MT 3060 (GSM2398) contains a quad-band (850/900/1800/1900 MHz) GSM radio.

- Class 4 (2W@850/900 MHz)
- Class 1 (1W@1800/1900 MHz)

New Event Reporting

For general event reporting information and for detailed information about these events, refer to the appropriate *MT 3060 AT Command Reference*.

Vehicle Identification Number (VIN)

The VIN is used as a unique identifier which is sent at first power-up with heartbeat messages and with events.

NOTE: Vehicle manufacturers are responsible for defining the list of data returned, therefore not all vehicles support returning the Vehicle Identification Number.

Excessive Engine Speed (RPM)

The MT 3060 has three definable thresholds. Excessive engine speed alerts are triggered when the engine speed (in RPM) exceeds a defined RPM level (in ¼ RPM increments) for a defined period of time in seconds (for example, 30 seconds). The event clears at a set threshold.

Unnecessary wear and tear on the Power-train Control Module (PCM) may occur if constant or frequent excessive engine speed is reported. One of the following situations may cause excessive engine speed:

- Obstructions, such as ice or mud, that cause wheel slippage if the obstruction is not removed
- Revving the RPM while in neutral
- Speeding or reckless driving that causes excessive RPM engine speed

Example:

The following AT command example sets the excessive engine speed threshold at 1 to 4000 RPM. Then, if exceeded for 3 seconds, it triggers the input event. This event clears once engine RPM is below 4000 for 30 seconds.

```
AT$OBDEES=1,16000,3,30
```

Vehicle Speed

A vehicle speed alert is triggered if the device is configured for vehicle speed alerts and the vehicle moves faster than one of the three configurable thresholds (for example, 70 MPH).

Example:

The following AT Command example sets the vehicle speed threshold at 1 to 112 KPH (~70 MPH). When the threshold is exceeded for 10 seconds, an input event is triggered. This event clears when the vehicle speed is reduced to 104 KPH (~65 MPH).

```
AT$OBDSPD=1,112,10,104
```

Vehicle Battery Voltage (Low Battery Warning)

The vehicle battery voltage alert is triggered when the vehicle's battery is reported to be below a threshold (for example, 10.8 V) for a user-defined period of time in seconds (for example, 300 seconds).

Example:

The following AT Command example sets the low battery threshold to 10.8 volts. When the voltage remains below this threshold for 300 seconds (5 minutes), it triggers an input event. Restoring voltage above the threshold for 300 seconds (5 minutes) clears this event.

```
AT$OBDLBL=10800,300,300
```

Check Engine Light (MIL Alert)

When the vehicle's "Check Engine" light illuminates, this indicates that a vehicle issue requires attention for diagnosis and/or repair. This is also known as a Malfunction Indicator Light (MIL). A user can configure a device to detect a MIL issue through the OBDII protocol and to send an alert when the device detects such an issue.

Trip Odometer Reporting

Trip odometer reporting provides the odometer miles accumulated from ignition-on to ignition-off, which is considered a "trip."

NOTE: Ignition events are not yet detected on hybrid or electric vehicles.

Idle Time Reporting

An idle time event is triggered when the vehicle's engine is running without the vehicle moving (i.e., velocity less than 3 KPH) for a defined period of time in seconds (for example, 300 seconds). The alert is cleared when the vehicle speed exceeds another speed and time threshold. If configured to do so, both the violation and clearing of the alert are reported.

Example:

The following AT Command example sets the idle time speed threshold to 3 KPH for 5 minutes (300 seconds) with a clearance time of 30 seconds. If the speed remains below this threshold for 300 seconds (5 minutes), it triggers the input event. Restoring speed above this threshold for 30 seconds clears this event.

```
AT$OBDIDL=3,300,30
```

Low Fuel Alert

The low fuel alert triggers when the vehicle's fuel level falls below a defined threshold in percent (for example, 12%) for a defined period of time in seconds (e.g., 60 seconds).

Example:

The following AT Command example sets the low fuel alert threshold to 12% for 1 minute (60 seconds) with a clearance time of 30 seconds. If the fuel level remains below this threshold for 60 seconds, it triggers the input event. Restoring the fuel level above this threshold for 30 seconds will clear this event.

```
AT$OBDLFL=12,60,30
```

Driver behavior Acceleration

Rapid acceleration events can be triggered when one of four available thresholds are exceeded as determined by the accelerometer in milli-Gs (e.g., 0.75) for a defined period of time in seconds (e.g., 30 seconds). The event clears if the acceleration falls below the threshold for a defined period of time. The command may also be configured to clear the event if it persists beyond a maximum duration.

Example:

The following AT Command example sets the rapid acceleration threshold #1 to .2G. If this threshold is exceeded for 1 second, then an input event is triggered. Keeping the acceleration of the vehicle below this threshold for 30 seconds clears this event. There is no maximum duration set in this example.

```
AT$DVBACL=1,200,1,30,0
```

Driver Behavior Deceleration (Harsh Braking)

Rapid deceleration events can be triggered when one of four available deceleration thresholds are exceeded as determined by the accelerometer in milli-Gs (e.g., 1.0) for a defined period of time in seconds (30 seconds). The command may also be configured to clear the event if it persists beyond a maximum duration.

Example:

The following AT Command example sets the rapid deceleration threshold #1 to .5Gs. If this threshold is exceeded for 1 second, then an input event is triggered. Keeping the deceleration below this threshold for 30 seconds clears this event. The event also clears if the threshold is exceeded for a duration of 10 seconds.

```
AT$DVBDCL=1,500,1,30,10
```

Motion Detection

You can configure motion alerts for vehicles to communicate that a vehicle is being towed. Motion detection, based on measuring movement through the accelerometer, occurs when the vehicle ignition is off and the vehicle is stationary.

A motion alert is triggered when motion is detected for a defined period of time.

OBDII Basic Event Data

Five additional data items can be included with event messages:

- VIN
- Firmware version ($PKG)
- OBD Protocol (such as J1850 PWM)
- Cellular signal strength (RSSI)
- OBD speed

Right/Left Turn (Lateral Acceleration)

Harsh turn events can be triggered when one of two available thresholds are exceeded as determined by the accelerometer in milli-Gs (for example, 0.75) for a defined period of time in seconds (for example, 30 seconds). The command may also be configured to clear the event if it persists beyond a maximum duration.

Example:

The following AT command example sets the lateral acceleration accelerometer threshold 1 to .25 Gs. If this threshold is exceeded for 2 seconds, an input event is triggered. This event clears in 15 seconds when the acceleration is below this threshold. The event also clears if the threshold is exceeded for a duration of 10 seconds.

```
AT$DVBLAL=1,250,2,15,10
```

Up / Down (Vertical Acceleration)

Up and down accelerometer events can be triggered when the threshold is exceeded as determined by the accelerometer in milli-Gs (for example, 0.75) for a defined period of time in seconds (for example, 30 seconds). The command may also be configured to clear the event if it persists beyond a maximum duration.

Example:

The following AT command example sets the vertical acceleration threshold 1 to 1.2Gs. If this threshold is exceeded for 1 second, an input event is triggered. This event clears in 30 seconds when the acceleration is below this threshold. The event also clears if the threshold is exceeded for a duration of 10 seconds.

```
AT$DVBVAL=1,1200,1,30,10
```

AT Commands Over SMS

A user can send AT commands to the MT 3060 via SMS. Please refer to Novatel Wireless M2M Application Note *AT Commands Over SMS* (ENF0000AN012) for details.

Store/Transmit Event Data

The user can configure the MT 3060 to store event-generated data in its internal memory to be sent over the air to a remote server. This feature can be enabled or disabled using the AT$MSGLOGEN command.

"Total Number of Unread Messages" is decremented if an unread message is read by the AT$MSGLOGRD command.

Example:

Assume there are 50 unread messages in the message queue and the total number of messages in the message queue is 100. This means that the first 50 messages have been read while the last 50 messages have not been read. If you send `AT$MSGLOGRD=0,1,51` then the total number of unread messages drops down to 49 after successful transmission of that message. However, if you send `AT$MSGLOGRD=0,1,99` then the total number of unread messages still remains at 50—that message is transmitted to the remote server.

You can also read a message stored in the memory by inputting the appropriate starting index number.

Synchronize RTC Time with GPS Time

The Real Time Clock (RTC) is synchronized with GPS time automatically every time the device is powered up and first acquires valid GPS data. Additionally, the RTC time is synched with GPS time every time the GPS time rolls over from 23:59:59 to 00:00:01.

Reporting Frequency

The reporting frequency of the device is:

- Periodic reporting is limited to a maximum of 1 per 6 seconds.
- The general reporting interval is 4 messages every 2 seconds.

3

Installation

SIM Installation
Activating The Device
Device Installation
Accelerometer Calibration

SIM Installation

The GSM/GPRS and HSDPA versions of the MT 3060 includes an on-board SIM carrier. There is no external access to the SIM.

NOTE: The CDMA 1xRTT version of the MT 3060 does not use a SIM, and therefore the device should not be opened.

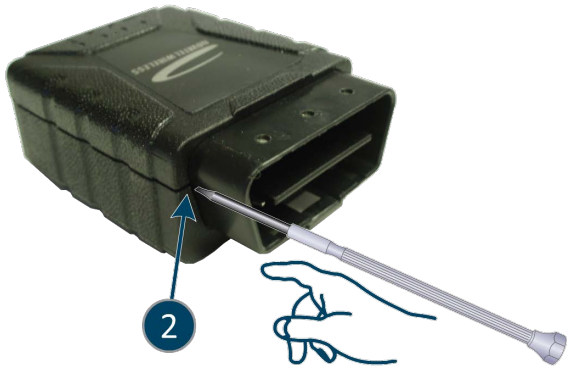
NOTE: You must obtain a SIM card from your network service provider. The operator must provision the SIM card for data. Without the SIM installed, the MT 3060 modem cannot communicate with the network.

WARNING! To prevent damage to the device or harm to you, Novatel Wireless highly recommends that you use extreme caution when opening and closing the MT 3060.

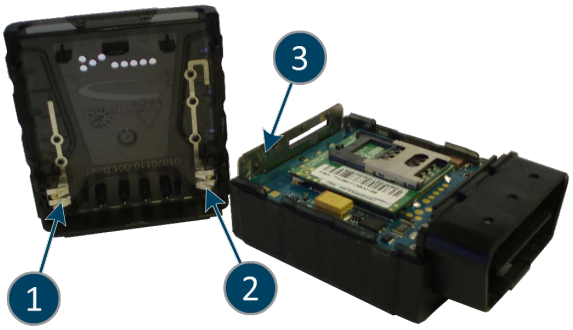
Tip: Use a 2.5 mm flat head precision screw driver to open the MT 3060.

To install the SIM into the MT 3060:

1. Insert the screw driver into the seam between the top and bottom of the casing near the OBDII connector to separate the case.



WARNING! When removing and replacing the cover take care not to damage the antennas. The antennas are situated in the top housing and at the rear of the device as indicated in the following image.



1	Bluetooth Antenna (Not currently supported)
2	GPS Antenna
3	Cellular Antenna

2. After you have removed the device cover, locate the SIM holder within the device.
3. Insert the SIM through the slot in the Cellular Antenna and into the SIM holder.

4. Place the MT 3060 cover onto the base of the device as shown in the following figure.
5. Apply gentle downward pressure to the back of the cover first and then carefully slide the cover into place.

6. Apply gentle down and forward pressure to the front of the cover until it snaps shut.

Activating The Device

NOTE: This task applies to the CDMA 1xRTT version of the MT 3060.

Verizon Activation:

To activate with Verizon, the user must contact Verizon and provide the MEID of the device to the provider. Once Verizon has acknowledged that the device is ready to activate, the user will then be required to send an activation string to the network.

Send the activation string: AT+CDV*22899. This will initiate a call with the network. A successful call will last approximately 40 seconds. If the call is terminated within 10-15 seconds, the call was not successful. Multiple attempts might be required. If the call is not successful after a few attempts, please check the MEID of the device and compare it with the MEID provided to the provider.

To verify that the activation has successfully completed, attempt a voice call AT+CDVxxxxxx. If the call is successful, then the over-the-air provisioning was successful.

As part of the activation process, the network will download a new PRL. The device will reset after the PRL is successfully reset to allow the new PRL to take effect.

Sprint Activation:

To activate with Sprint, the user must contact Sprint and provide the MEID of the device. After the MEID is provided to Sprint, the user will need to power on the device when instructed by the carrier. The device will automatically activate when it attaches to the network. For the first attempt the user should see a series of unsolicited reports. If the device gets to +HFA: 6, the device has successfully activated. This process can take up to 60 seconds to complete. AT+HFA? can be used to query the activation state. A response of 1 means the device is successfully activated. A response of 0 means that it has not.

An unsuccessful activation attempt may take up to 5 minutes, because of the number of retries specified by the carrier.

As part of the activation process, the network will download a new PRL. The device will reset after the PRL is successfully reset to allow the new PRL to take effect.

Device Installation

Instructions provided in this section describe the hardware installation of the MT 3060 device.

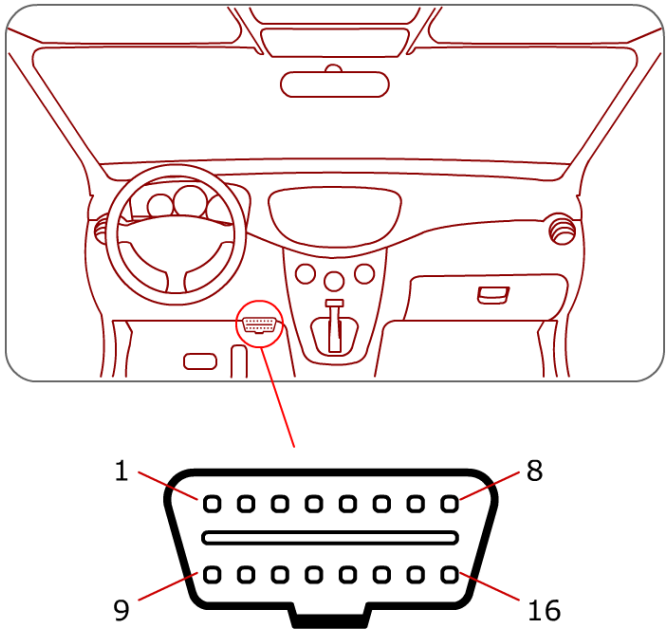
WARNING! The MT 3060 is NOT a waterproof or sealed device. Keep the device away from water or any other liquids.

NOTE: Prior to installing the MT 3060, make sure the vehicle is parked on level ground with the ignition off.

To install the MT 3060 in a vehicle, follow these steps:

1. Locate the OBDII socket.

   NOTE: The location will vary between different vehicle manufacturers, models, and production years.



2. Carefully insert the MT 3060 into the OBDII socket.

   After the device is installed, the GPS lock and the cellular connection LEDs illuminate or flash to indicate the device is working properly. (For more information, see the LEDs section.)

NOTE: The device starts the accelerometer auto-calibration process immediately after the device is installed and the vehicle's ignition is turned on.

Accelerometer Calibration

The accelerometer undergoes an automatic calibration sequence on the first drive after any of the following events:

- Device installation
- Software upgrade
- Vehicle battery replacement (or recharge if battery was fully discharged)
- Device auxiliary processor reset

WARNING! Failure to follow the process below could cause an undesired behavior of the motion feature. Failure to drive straight on level ground during the automatic calibration may reduce the accuracy of the accelerometer and have an adverse impact on events triggered by accelerometer readings.

- Make sure the vehicle is parked on level ground prior to installing the MT 3060.
- Drive the vehicle in a straight path on level ground during the automatic calibration. An inclined surface will put part of the gravity vector into the XY plane, which affects the acceleration thresholds. (A 5.7 degree angle places 10% of the gravity vector into the XY plane.)

NOTE: When the vehicle passes 32 KPH, the auxiliary processor assumes that the vehicle is moving in a straight line and determines the forward axis.

4

Compliance and Regulatory

General Disclaimer
Warranty Information
Regulatory Compliance
Battery Information and Safety Requirements

General Disclaimer

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Version Verification

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Warranty Information

This warranty applies to (a) products sold directly by Novatel Wireless, unless a different warranty is specified in a written agreement between Novatel Wireless and the purchaser; and (b) products sold to end users through a distributor authorized by Novatel Wireless, but only where the authorized distributor does not provide a separate warranty on such products, and Novatel Wireless has agreed to provide this warranty to such end users. If you purchased the product from an authorized distributor, please check whether this warranty from Novatel Wireless, or a separate warranty from the distributor, applies to your purchase. This warranty does not apply to any (i) accessories or batteries for the products; or (ii) demonstration samples or prototypes of the products. Unless otherwise provided in a written agreement between Novatel Wireless and the purchaser, all such accessories, batteries, samples or prototypes are provided by Novatel Wireless AS IS without any warranty of any kind.

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During the warranty period, Novatel Wireless, at its expense and in its sole discretion, will repair the product, or replace the product with a corresponding or equivalent product, if it is determined to have a covered defect, provided that the purchaser first notifies Novatel Wireless (directly or through its authorized distributor from which the product was purchased) of any such defect, furnishes Novatel Wireless with a proof of purchase (if required), requests and obtains a return merchandize authorization (RMA) number from Novatel Wireless, and returns the product under that RMA to Novatel Wireless (or, at Novatel Wireless's option, to its authorized distributor), with the shipping charges being prepaid by purchaser. If, upon reasonable examination of the returned product, Novatel Wireless does not substantiate the defect claimed by purchaser, or determines that the defect is not covered under this limited warranty, Novatel Wireless will not be required to repair or replace the product, but may instead reship the product to the purchaser (or, at Novatel Wireless's option, to its authorized distributor where the product can be made available to purchaser), in which case the purchaser shall be responsible for paying Novatel Wireless's cost for reshipping the product to purchaser (or to Novatel Wireless's authorized distributor), and Novatel Wireless's usual charges for unpacking, testing, and repacking the product for reshipment to purchaser (or to Novatel Wireless's authorized distributor). Purchaser shall bear the risk of loss or damage in transit to any product returned by purchaser to Novatel Wireless, or any returned product not found to be defective or covered under this warranty, and reshipped by Novatel Wireless to purchaser (or to Novatel Wireless's authorized distributor). In the event Novatel Wireless repairs or replaces a defective product covered by this limited warranty, the repaired or replacement product will be covered under this limited warranty for the remainder of the original

warranty period on the defective product, or a period of ninety (90) days, whichever is longer. If Novatel Wireless is unable to repair or replace a defective product covered by this limited warranty, Novatel Wireless will provide to purchaser a credit or a refund (at Novatel Wireless's option) of the original purchase price (excluding taxes and shipping charges). Any returned and replaced product, or any product for which Novatel Wireless has furnished a credit or a refund, becomes the property of Novatel Wireless.

Novatel Wireless shall not have any obligation to provide any firmware bug fixes, upgrades or new releases except as may be necessary to correct any covered defect of which purchaser notifies Novatel Wireless in writing during the warranty period. Novatel Wireless, from time to time and in its sole discretion, may make available for download on its website (www.nvtl.com), or may provide via email, certain firmware bug fixes, upgrades or new releases for the product. Download and use of any such bug fixes, upgrades or new releases is subject to all of the applicable terms and conditions of Novatel Wireless's technical support policy as posted and updated on its website. Novatel Wireless shall have no obligation under this limited warranty for (a) normal wear and tear; (b) the cost of procurement of substitute products; or (c) any defect that is (i) discovered by purchaser during the warranty period but for which purchaser does not request an RMA number from Novatel Wireless, as required above, until after the end of the warranty period, (ii) caused by any accident, misuse, abuse, improper installation, handling or testing, or unauthorized repair or modification of the product, (iii) caused by use of any materials not supplied by Novatel Wireless, or by use of the product other than in accordance with its documentation, or (iv) the result of electrostatic discharge, electrical surge, fire, flood or similar causes. The purchaser (or its customers, as applicable) shall be solely responsible for the proper configuration, testing and verification of the Novatel Wireless product prior to deployment in the field, and for ensuring that any end user product or system into which the Novatel Wireless product is integrated or incorporated operates as intended and meets the requirements of purchaser (or its customers). Novatel Wireless shall have no responsibility whatsoever for the integration, configuration, testing, verification, installation, upgrade, support or maintenance of any such end user product or system, or for any liabilities, damages, costs or expenses associated therewith.

NOVATEL WIRELESS'S SOLE RESPONSIBILITY AND PURCHASER'S SOLE REMEDY UNDER THIS LIMITED WARRANTY SHALL BE FOR NOVATEL WIRELESS TO REPAIR OR REPLACE THE PRODUCT (OR IF REPAIR OR REPLACEMENT IS NOT POSSIBLE, PROVIDE A CREDIT OR REFUND OF THE PURCHASE PRICE) AS PROVIDED ABOVE. NOVATEL WIRELESS EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, SATISFACTORY PERFORMANCE AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL NOVATEL WIRELESS BE LIABLE FOR ANY INDIRECT, SPECIAL, EXEMPLARY, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOSS OR INTERRUPTION OF USE, DATA, REVENUES OR PROFITS) RESULTING FROM A BREACH OF THIS WARRANTY OR BASED ON ANY OTHER LEGAL THEORY, EVEN IF NOVATEL WIRELESS HAS BEEN ADVISED OF THE POSSIBILITY OR LIKELIHOOD OF SUCH DAMAGES.

Some jurisdictions may require a longer warranty period than specified above and, accordingly, for products sold in those jurisdictions the applicable warranty period shall be extended as required under the laws of those jurisdictions. Furthermore, some jurisdictions may not allow the disclaimer of implied warranties or the exclusion or limitation of incidental or consequential damages, so the above disclaimer, limitation or exclusion may not apply to products sold in those jurisdictions. This limited

warranty gives the purchaser specific legal rights and the purchaser may have other legal rights that vary from jurisdiction to jurisdiction. This limited warranty shall be governed by the laws of the State of Texas, United States of America, without regard to conflict of laws principles. This limited warranty shall not be governed in any respect by the United Nations Convention on Contracts for the International Sale of Goods.

Regulatory Compliance

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits pursuant to Part 15 Subpart B. FCC Part 22 & Part 24 is covered by the "modular approval" process for the embedded wireless module. This approach, described by FCC Public Notice DA 00-131407 released June 26, 2000, is intended to afford relief to equipment manufacturers by eliminating the requirement for obtaining a new equipment authorization for the same transmitter when installed in a new device.

These limits are designed to provide reasonable protection against harmful interference in an appropriate installation. This equipment generates, uses, and can radiate radio frequency energy and, if not used in accordance with instructions, can cause harmful radiation to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

RF EXPOSURE

Your device is a radio transmitter and receiver. It is designed and manufactured not to exceed the emissions limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission (FCC) of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. These guidelines are based on the safety standards previously set by the U.S. and international standards bodies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for wireless RF devices, such as the device, employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg. SAR values at or below that limit are considered safe for the general public.

Before a wireless RF device is made available for sale to the Public, it must be tested and certified to the FCC that it does not exceed the SAR limits established by the FCC. Tests for SAR are conducted using the positions and locations (e.g., at the ear or worn on the body) as required by the FCC for each device model.

In order to use this device without additional FCC certification approvals, the installation must meet the following conditions:

For the transmitter to meet the MPE categorical exclusion requirements of 2.1091, the ERP must be less than 1.5 watts for personnel separation distance of at least 20 cm (7.9 in). Therefore, the maximum antenna gain cannot exceed +3.3dBi. If greater than 1.5 watts exists, then additional testing and FCC approval is required.

R&TTE CE

This device has been fully tested and complies with the requirements of EN301 489-1, EN301 489-3, EN301 489-7, EN60950-1, IEC60950-1, EN62311, and EN300 440-2. Compliance to EN301 511 has been demonstrated through testing performed on this device and the embedded wireless module. RF exposure levels are below the recommended levels at distances of 6.7 cm between the antenna and user.

Novatel Wireless hereby declares that this device is in compliance with the essential requirements and other provisions of the Directive 1999/5/EC.

A full copy of the declaration of conformity can be found at http://documentation.nvtl.com.

Industry Canada

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this

device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux normes d'Industrie Canada exempts de license(s) RSS. Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas provoquer d'interférences, et (2) cet appareil doit accepter toute interférence, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appareil.

ROHS COMPLIANCE

This device has been designed to comply with the European Union Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2002/95/EC), effective since July 1, 2006.

DISCLAIMER

The information and instructions contained within this publication comply with all FCC, GCF, PTCRB, R&TTE, IMEI and other applicable codes that are in effect at the time of publication. Novatel Wireless disclaims all responsibility for any act or omissions, or for breach of law, code or regulation, including local or state codes, performed by a third party. Novatel Wireless strongly recommends that all installations, hookups, transmissions, etc., be performed by persons who are experienced in the fields of radio frequency technologies. Novatel Wireless acknowledges that the installation, setup and transmission guidelines contained within this publication are guidelines, and that each installation may have variables outside of the guidelines contained herein. Said variables must be taken into consideration when installing or using the product, and Novatel Wireless shall not be responsible for installations or transmissions that fall outside of the parameters set forth in this publication.

Battery Information and Safety Requirements

Failure to comply with all of the following precautions could:

- Cause personal injury or property damage
- Cause abnormal chemical reactions which would make the battery overheat, smoke, distort, leak, or catch on fire
- Destroy internal protections built into the battery
- Shorten battery life
- Reduce battery performance

Precautions

- Read this entire manual and the label on the exterior of the battery.
- Keep the battery away from sources of excessive heat such as fire, stoves, or direct sunlight.
- Keep the battery away from sources of high voltage or static discharge.
- Do not use or store the battery with other batteries or where it could touch metal.
- Do not put the battery into a microwave oven.
- Do not allow the battery to be crushed.
- Keep the battery away from children.
- Do not drop the battery.
- Do not allow anything to touch any of the battery contacts
- Do not connect two or more of the contacts.
- Do not disassemble, destroy, or attempt reassembly of the battery.
- Do not place or leave the battery in a damp or wet environment.
- Do not allow water to touch the battery.
- Do not wrap the battery with conductive material.
- Properly dispose of the battery.
- Do not incinerate or burn the battery.
- Do not leave or discard the battery where it could get wet or become submerged in water.
- Do not damage the battery.

- Do not weld or solder anything to the battery, the attached wires, or the connector.
- Do not use this battery in any device other than supplied.
- Use of this battery in other devices could result in unsafe conditions.
- Risk of explosion if battery is replaced by an incorrect type.
- Do not touch a leaking battery or materials that may have leaked from a battery. Do not allow it to touch your skin or clothes. If touched, immediately rinse affected areas thoroughly with water. Leaked materials may cause skin irritation. Seek medical attention if irritation persists. If it contacts your eyes, do not rub your eyes. Rinse the eyes thoroughly with water, and see a doctor immediately.